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Presented for filing is a new patent application claiming priority from a provisional patent application of:

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Title: DECOMPOSING NATURAL IMAGE SEQUENCES

Enclosed are the following papers, including those required to receive a filing date under 37 CFR §1.53(b):

	<u>Pages</u>
Specification	18
Claims	9
Abstract	1
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Drawing(s)	7

Enclosures:

- Request and Certification Under 35 U.S.C. 122(b)(2)(B)(i) (1 page)
- Application Coversheet, (1 page)
- Postcard.

Under 35 USC §119(e)(1), this application claims the benefit of prior U.S. provisional application 60/421,269, filed October 25, 2002.

Basic filing fee	\$750
Total claims in excess of 20 times \$18	\$378
Independent claims in excess of 3 times \$84	\$168
Fee for multiple dependent claims	\$0
Total filing fee:	\$1296

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DECOMPOSING NATURAL IMAGE SEQUENCES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/421,269, filed on October 25, 2002, which is incorporated by reference herein.

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BACKGROUND

The present invention relates to representing and analyzing sequences of images of a natural scene.

It has been proposed that natural images can be described in terms of intrinsic characteristics, such as range, orientation, reflectance, and incident illumination of the surface element visible at each point in the image. H.G. Barrow & J.M. Tenenbaum, *Recovering intrinsic scene characteristics from images*, in A. Hanson & E. Riseman, editors, *Computer Vision Systems*, Academic Press (1978). The extraction of information describing such characteristics is complicated, however, by the fact that the information representing the combined characteristics for each pixel in an image is confounded in a single pixel value representing the intensity of light captured for the corresponding location. The decomposition of these pixel values to obtain information corresponding to intrinsic characteristics depends on the introduction of constraints derived from assumptions about the scene and the imaging process.

In one approach to the problem of decomposing an image sequence including t images into constant reflectance and varying illumination such that:

$$I' = RL' \quad (1)$$

the images I' are first transformed into the log domain where their compositions as component-wise products of reflectance and illumination are replaced by component-wise sums of corresponding logged terms:

$$i' = r + l' \quad (2)$$

where i' , r , and l' denote the logs of I' , R , and L' .

Vertical and horizontal derivative filters f_1 and f_2 are then applied to i' :

$$i'_n = r_n + l'_n \quad (3)$$